Te Waonui Forest Retreat

Environmentally Sustainable Design Summary

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dalman ARCHITECTURE

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The Te Waonui Forest Retreat will incorporate a number of measures to greatly reduce its environmental impact. The Retreat is at the cutting edge of accommodation design within New Zealand in relation to sustainability measures.

Many of these measures meld easily with the focus of the Retreat in being a 100% New Zealand experience.

The Retreat is designed to stand the test of time, it is a durable New Zealand building designed in an appropriate way to complement and meld with its stunning natural setting.

SITE ECOLOGY

Franz Josef is an area of outstanding natural heritage.

From the outset design decisions have been made to maximise the amount of existing native bush retained on the site. Important specimen trees were carefully located and building locations adjusted to preserve as many of these as practicable.

The Rain Forest Courtyard is a key feature of the development with all rooms having a wonderful aspect into preserved native bush. The Retreat will attempt to encourage native bird populations using feed stations to enhance the biodiversity and atmosphere of the Rain Forest Courtyard.

Where bush has been removed, new landscaped areas will use locally appropriate native plantings to re-establish the bush environment in and around the buildings. Some of the buildings hover above ground level allowing for the ground cover and ferns typical of the West Coast Rain Forest to help meld the buildings back into their surroundings.

Hard asphalt areas have been minimized with permeable gravel used to assist rainwater soakage back into the earth. If the use of cars reduces in the future the gravel areas can be reverted back to native bush with minimal effort.

Swales are generally used in favour of hard concrete kerbs and channels. Swales allow for a natural system of rain water collection and dispersal and provide a softer interface with hard-standing areas and the native bush.

Car parking numbers have been drastically reduced to allow a greater area of bush to remain.

The buildings are designed with a soft timbered feel and adopt a colour-scheme sitting comfortably with the tones of the native bush on site.

The atmosphere will be one of discovery, a Retreat hidden in the bush, steaming hot pools minutes away, glow-worms by night and native bird call as the guests arise.

PASSIVE DESIGN

Intelligent building design can mean the building itself assists with energy efficiency and presents and appropriate response to the conditions of the site.

Large overhanging roofs shelter the buildings from the intense rain found in this location but also serve to shelter the interior spaces keeping them appropriately cool throughout the humid summer. Slatted screens and sun shading elements further filter the impact of the sun, wind and rain on the building.

Best practice thermal insulation is provided throughout the Retreat. Guest room buildings have double insulated roofs and wall insulation is substantially better practice than any relevant building codes. Windows throughout are double glazed. This will hugely assist thermal comfort and energy efficiency.

Some exposed thermal mass (concrete, stone and tiles on concrete) in the public areas of the Retreat will assist in creating a steady and comfortable thermal environment in these spaces.

The foyer, bar and restaurant as well as service areas are naturally ventilated. A sophisticated system of automatically controlled opening windows and ceiling fans provides for natural air movement. The elimination of air-conditioning from these areas will provide a significant energy saving.

Air conditioning to guest suites is of an energy efficient, modern design with a building management system providing energy management solutions.

OCCUPANT HEALTH AND LOW TOXICITY

The focus has been to provide healthy and environmentally safe accommodation to maximize the guests well being.

The internal environment will be warm, quiet and dry.

Natural ventilation is encouraged, with the bars, foyer and restaurant relying on passive and fully naturally ventilated control system. Rooms have opening windows and sliding doors to the fresh Westland Rain Forest air.

Natural lighting is abundant, albeit filtered through the leafy canopies of the Rain Forest surroundings. Most guest ensuites are naturally lit from the exterior.

Finishes have been selected to drastically reduce volatile organic compounds (nasty chemicals) present in the air. New Zealand premier independent environmental certification system

"environmental choice" has been used as a bench mark for the selection of many of the internal materials.

Natural NZ wool carpets are largely from the Environmental Choice stable; carpet underlays are recycled and achieve environmental certification also. Acoustic overlay floor treatments achieve Good Environmental Choice Australia certification. Most of the tiling also achieves environmental certification.

Practically all of the paint systems are from the Environmental Choice range also. Paint systems are low toxicity and have minimal chemical off gassing.

MATERIALS

Materials are chosen where ever possible to be made in New Zealand and locally appropriate. This contributes to a reduction of the buildings Carbon Footprint.

Independent environmental certification of many of the materials has been required by the demanding specification.

The used of high energy content materials such as steel are minimized with a real emphasis on fully renewable materials such as timber. Wood may be the world's most renewable raw material. For this reason, forests, and the wood they provide are vital in the fight against climate change. Timber is an abundant renewable resource in New Zealand.

Timber claddings, structural elements and furnishings prevail in this Retreat. Timbers are specified with an appropriate environmental certified source ensuring that responsible, renewable and non-rainforest sources are used for the timbers. Pinus Radiata, Cedar, Eucalyptus and Vitex (sustainable hardwood) combine to create a rich palette of warmth to the exterior and throughout the interior.

Measures such as this generally reduce the amount of energy invested in the construction components of the building and ensure timbers are sourced responsibly.

Generally an emphasis on low processed natural materials is made in this building .

Recycled hardwood telegraph poles, railway sleepers, timbers, local natural stones, natural wools and timber panel products abound.

Concrete aggregates and hard fill is locally sourced from the Waiho River, reducing transportation energy and utilising a hugely abundant resource – the gravels washed regularly down from the Southern Alps in flood events by this river. The concrete is manufactured just a few hundred metres down the road from the site.

The local character of this gravel source is expressed in the Retreats concrete walkways and terraces, the whites and silvery greys of the local stone become evident in the exposed aggregates of these surfaces.

FIXTURES, FURNITURE AND FITTINGS

The interior design scheme for the Retreat takes its inspiration from the region and the qualities of the site.

Where-ever possible New Zealand designed and manufactured elements are introduced.

Natural wool fabrics and carpets, organic cotton bedspreads are all utilized.

Local industry is supported by the use of possum skins for cushioning throughout. The possum is a pest in New Zealand and extremely destructive of the Rain Forest. This luxurious material is sourced locally.

ENERGY EFFICIENCY

Energy efficiency is a key aspect in reducing the carbon footprint of a Hotel . Several measures are taken at Te Waonui to assist with the energy efficiency of the premises.

A building management system provides for computerized control and monitoring of mechanical systems within the building. This can greatly assist with the energy management of the building. Staff training in the use of the building systems will be provided to ensure optimal use of systems is achieved during the life of the building.

LIGHTING

Natural lighting is used extensively throughout the property potentially reducing artificial lighting energy loads.

Generally interior colour schemes are light and airy to enhance the benefits of the natural light filtering into the building.

Artificial lighting is deployed in an energy efficient manner. Very energy efficient lamps are specified for all exterior lights located on walkways and pathways. All halogen lamps utilise cutting edge technology, resulting in lower power consumption when compared to conventional halogen lamps. The use of a lighting control system within the Bar, Lobby and Restaurant will, amongst other things, greatly extend the lamp life of the lighting systems within these areas. Light levels on walkways will be reduced by 50% during off peak hours to assist with energy efficiency. An electrical load shedder will limit the maximum electrical demand on the site.

HOT-WATER HEATING

The heating of water is a huge consumer of energy. In this Hotel localised electric water heating per block will reduce pipe runs and resultant energy losses. The detail of the hot water reticulation system will also assist with reduced energy use (circulation of water at 45^{o}C to reduce losses from the ring main system). The wet and sometimes cloudy climate reduced the effectiveness of solar hotwater systems in this location and they were discounted as an option.

SPACE HEATING AND COOLING

Some passive means are used with minimal energy inputs to assist with the heating and cooling of spaces – adequate natural ventilation and thermal mass temperature stabilizing effects are used in some areas for example.

Double glazing and best practice insulation to the building vastly increases the energy efficiency of this building.

The foyer, bar and restaurant are heated using a hot water radiator and under floor hybrid system. This allows for a very high quality of heat within these spaces. A small efficient LPG boiler powers this heating system.

In guest suites efficient heat pump technology is used for heating: 1 unit of energy in is resultant in 2 units of heat out. Guests have the option of naturally cooling their rooms with generous opening windows and sliding doors out into the Rain Forest Courtyard.

Within the guest suite spaces individual comfort control allows the temperature to be controlled within small well defined zones accommodating differences personal preferences.

CONTROL SYSTEMS

Control systems have a fundamental effect on the amount of energy used by a Retreat during its operation.

At Te Waonui smart after-hours control of air conditioning systems is employed allowing shutdown and/or setback during unoccupied periods.

A building management system allows for refined control of mechanical systems throughout the building and permits good energy management practices

EMISSIONS

Emissions generated by a building are best reduced to the minimum.

Care has been taken to ensure all refrigerants and insulating products are zero ozone depleting.

WATER EFFICIENCY

Water is a reasonably abundant resource in this location but this Hotel aims to substantially reduce water use in a number of ways.

In the guest suites environmentally certified tap ware, and showerheads with a low water use option will help reduce the Hotel's water consumption. Hot water is a major source of energy consumption in a hotel and sensitive use of hot water will help increase energy efficiency and reduce the carbon footprint of this Retreat .

In addition certified low water use guest suite toilets further reduce potable water consumption.

No irrigation systems are used.

WASTE MINIMISATION

The reduction of waste is a part of ensuring a hotel is sustainable both during construction but especially during the life of the building.

Recycled content materials are used in several aspects of the Retreat. Recycled hardwood telegraph poles support the main entry and loading dock canopies. Recycled hardwood railway sleepers form lighting bollards throughout the site.

Carpet underlays are substantially manufactured from recycled content.

Many of the main structural elements of the building are bolted together. This technique increases the ease of disassembly in the future, thereby increasing the possibility of reuse of building elements should the buildingever be removed.

Sheet products are designed to suit factory produced modules wherever possible reducing wastage.

The opportunity for waste separation during construction remains possible.

Each guest suite will have a custom designed recycling centre enabling guests to separate their waste to ensure recycling occurs.

CONSTRUCTION SYSTEMS AND PROCESSES

The design of the Retreat buildings has been carefully executed to reduce the need to heavy machinery which would have too much impact on the sensitive bush surroundings.

Construction elements are generally kept small and manageable reducing the need for cranage.

Many elements have been designed so they can be pre-fabricated off site, minimising disturbance on the site and reducing on site storage and staging areas. The bush is further protected by this measure.

A pollution reducing “Envirowash” system for paint disposal is to be used during the construction phase to limit the effect of paint run off into the environment.

There is an emphasis on returning the bush clad site to its former state once construction is complete.